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NEW SPECIES OF MALLOPHAGA FROM *AFROPAVO CONGENSIS* CHAPIN

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Through the kindness of The American Museum of Natural History and of Dr. Schouteden of the Belgian Congo Museum, Tervueren, the author has been able to examine specimens of Mallophaga collected from *Afropavo congensis*, the remarkable gallinaceous bird recently discovered and described by Dr. Chapin. There are eight species represented in the material examined, four belonging to the superfamily Ischnocera and four to the superfamily Amblycera. In the present paper only the ischnoceran species are considered since species of amblyceran Mallophaga from gallinaceous birds cannot be described satisfactorily without a complete revision of the existing genera and species. The author hopes to undertake this revision shortly and will then be in a position to describe the remaining species from *Afropavo congensis*.

The species described below are assignable to two genera, *Lipeurus* and *Goniodes*, and as would be expected from the host these species are not closely related to any of the known species from gallinaceous birds. In a paper shortly to be published the author has shown that the *Lipeurus* species from gallinaceous birds fall into three genera (excluding *Lagopoecus*), examples of which may be found on one host. Within the genus true *Lipeurus* [genotype *L. caponis* (Linné)] there are a number of groups of closely related species, among which is one containing species from the following genera of Phasianidae: *Gennaeus*, *Gallus*, *Phasianus*, *Chrysolophus*, *Rheinardia* and *Rhizothera;* the species from *Pavo cristatus* (description in the press) although resembling this group differs in certain important characters; species from *Numida*, *Acryllium*, *Phasidus* and *Agelastes* form another and quite distinct group. The *Lipeurus* from *Afropavo* is typical of the first-mentioned group containing species from *Gennaeus* and *Gallus*.

The larger *Goniodes* from *Afropavo*, *G. wilsoni*, has no close affinities with the *Goniodes* from such Phasianidae as *Gallus*, *Phasianus* and *Gennaeus*, nor with the typical and distinct species, *G. pavonis* (Linné) from *Pavo cristatus*. A distinct species from *G. pavonis* also from *Pavo*

cristatus (to be described shortly) has the terminal segment of the male abdomen similar to that of *G. wilsoni*. However, it is apparent from a comparison of this species from *Afropavo* with all other known species from gallinaceous birds that it resembles most nearly an unnamed species of *Goniodes* from *Guttera plumifera* (correct identity of host doubtful). *G. wilsoni* has the following characters in common with this unnamed species: the general shape of the head; large thickened trabeculae overhanging the antennae; antennae without greatly enlarged first segment; a large number of hairs on the head and thorax; general characters of the abdomen especially in the presence of dorsal clumps of hairs each side of the mid-line of certain segments and the form of the terminal segment; paramera of male genitalia unequal in length. The females of these two species also resemble each other in the form of the head, trabeculae, chaetotaxy of head, thorax and abdomen. In both the male and the female, *G. wilsoni* differs from the other species in the form of the pleurites and in the absence of intertergital thickening.

The remaining two species, *Goniodes chapini* and *G. afropavo*, which are almost certainly closely related to each other, have apparently no near affinities with any of the known *Goniodes*. Superficially these two species recall *G. curvicornis* Giebel from *Argusianus argus* and an unnamed species from *Rheinardia o. ocellata*, but at the present state of our knowledge of the genus *Goniodes* it cannot accurately be said that their true affinities lie with the latter species. These two species, *G. chapini* and *G. afropavo*, are also of interest as an example of the occurrence of two closely related species on the same host in which the females differ but slightly from each other while the two males exhibit a greater degree of difference. In the present case it has not been possible to settle with complete certainty to which males the respective females belong as all the specimens where collected from one host and the differential characters of the males of the two species are the presence of secondary sexual characters in *G. chapini*, i.e., modified antennae, trabeculae and shape of head, and the form of the male genitalia; these characters cannot therefore be used to separate the two females. The differential characters which have been used in the case of the females are the shape of the trabeculae and the size and shape of the abdomen.

It is unwise in the present state of our knowledge of Mallophaga, with so many problematic unknown species, to draw any conclusions from the mallophagan species as to the relationships of the avian host species and genera within a family, but it is of interest to note that the

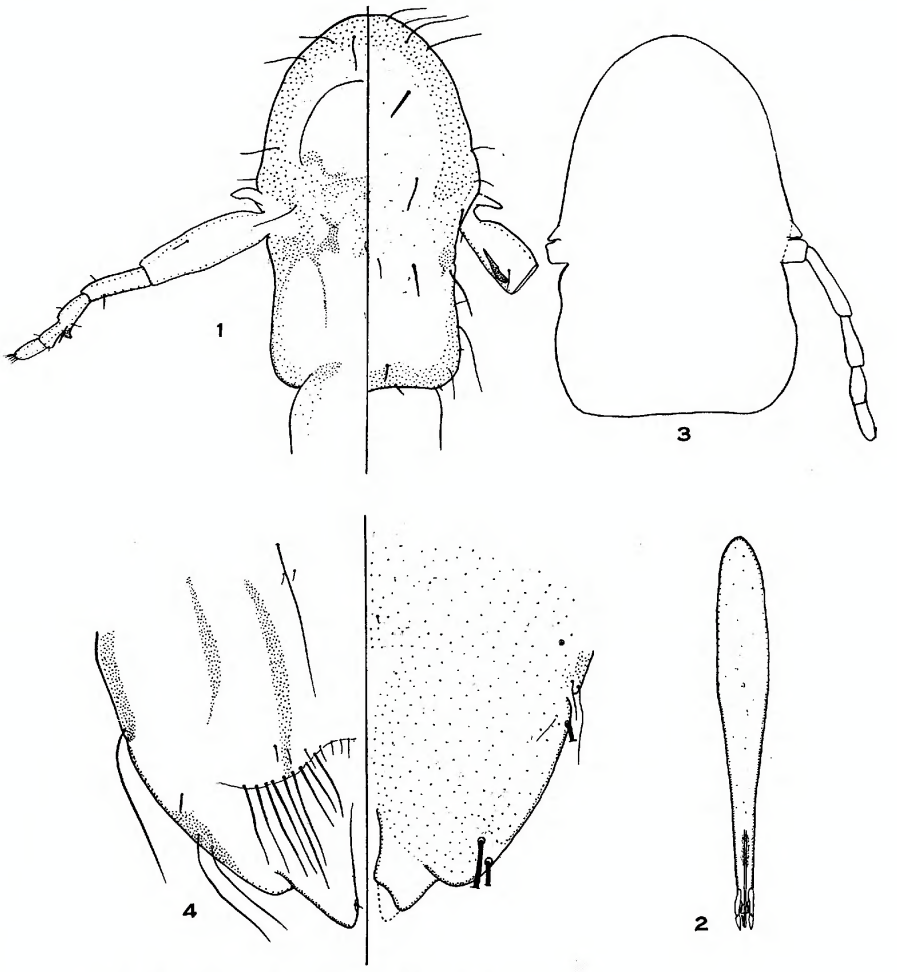


Fig. 1. *Lipeurus schoutedeni*, head of ♂.
Fig. 2. *Lipeurus schoutedeni*, genitalia of ♂.
Fig. 3. *Lipeurus schoutedeni*, head of ♀.
Fig. 4. *Lipeurus schoutedeni*, terminal segments of ♀ abdomen.

Mallophaga parasitic on *Afropavo* are not closely related to any of the known species and that their affinities are found both with species from the Phasianinae and the Numididae. Thus *Lipeurus schoutedeni* has its affinities with species from the *Gennaeus, Gallus, Phasianus* group; while the affinities of *Goniodes wilsoni* lie with species from *Guttera; G. chapini* and *G. afropavo* on the other hand seem to have no close affinities with any known species. It is possible to suggest, therefore, from

a consideration of the mallophagan evidence that *Afropavo* may form the link between the Phasianinae and the Numididae.

Lipeurus schoutedeni, new species

Figures 1 to 4

This species is distinguished from *Lipeurus caponis* (Linné) by the long, narrow head in both sexes and in the male by the presence of 2 pre-antennal and 2 post-antennal spinelike hairs and by the shape of the basal plate and in the female by the characters of the terminal segments.

DESCRIPTION OF MALE.—Head (Fig. 1) with occipital bands present and with first segment of antenna enlarged and bearing a short thickened process and third segment with thickened free distal end.

Prothorax with straight lateral and posterior margins, the latter bearing a short hair each side. Meso-metathorax showing lateral indication of meso-metathoracic junction; posterior margin shallowly convex and bearing a postero-lateral hair and spine, a clump of 1 short and 3 long hairs and a single shorter hair each side of midline.

Abdomen with general characters and chaetotaxy as in *Lipeurus caponis;* pleurites narrow and posterior margin of terminal segment rounded.

Male genitalia with general characters as shown in figure 2 (material inadequate for detailed figure).

DESCRIPTION OF FEMALE.—Shape of head as shown in figure 3. Chaetotaxy of head as in the male but the 4 dorsal spinelike hairs are replaced by shorter and finer hairs and the dorsal hair at the upper level of the mandible is absent.

Thorax as in the male but broader.

Abdomen with general characters and chaetotaxy as in *L. caponis* with the exception of the terminal segments (Fig. 4).

Measurements

	MALE		FEMALE	
	Length	Breadth	Length	Breadth
Head	0.68 mm.	[a]0.42 mm.	0.70 mm.	[a]0.44 mm.
		[b]0.35		[b]0.46
Prothorax	0.20	0.29	0.19	0.32
Meso-metathorax	0.34	0.43	0.37	0.49
Abdomen	1.78	0.47	1.82	0.60
Total	2.96		3.01	
C.I. [a]	.....	0.62	.....	0.63
[b]	.....	0.51	.....	0.66

Head[a] is greatest pre-antennal breadth.
Head[b] is greatest post-antennal breadth.
C.I. is head index (breadth:length).

MATERIAL EXAMINED.—1♂, 4♀, from *Afropavo congensis* from E. Congo Forest, collected July, 1937.

HOLOTYPE.—♂ in The American Museum of Natural History.

Goniodes wilsoni, new species

Figures 5 to 9

The relationships of this species and its differential characters have been discussed above.

DESCRIPTION OF MALE.—Head (Fig. 5) with large overhanging trabeculae and with numerous dorsal hairs; antenna with first segment not greatly enlarged and third produced into a somewhat transparent forwardly directed projection running parallel to the fourth segment.

Thorax as shown in figure 5.

Abdomen widest at segment III and with segment I large, segment VIII reduced and segment IX narrowed and rounded posteriorly. Pleurites distinct and broad; tergal plates I–VIII interrupted medianly and sternal thickening in the form of small lateral segmental plates each side of mid-line.

CHAETOTAXY OF THE ABDOMEN.—Lateral and dorso-lateral hairs on the posterior margin of segment I, 18–20 in number; on segment II, 10–14; segment III, 7–10; segment IV, 8–10; segment V, 10–12; segment VI, 6–8; segment VII, 5–8; segment VIII, 4–6. On the dorsal surface segment I has 18 hairs each side of the mid-line; segment II has 22–26 each side; segment III has 28–30 of which the central 18 each side are thicker and form a clump of hairs situated at the inner end of the tergal plate; segment IV has 29 hairs each side with the central 15 each side thicker and forming a clump as in segment III; segments V–IX as shown in figure 6. On the ventral surface segments I–IV with a central hair each side of mid-line; segments V–VI with 2 central hairs each side; segments VII–IX as shown in figure 6; all segments also bear a varying number of minute spines on the ventral surface.

Male genitalia with greatly lengthened basal plate and with one paramera shorter and narrower than the other (Fig. 7).

DESCRIPTION OF FEMALE.—Head (Fig. 8) with dorsal hairs less numerous than in the male; anterior margin with 4 short marginal hairs each side; 1 sub-marginal hair, 1 in upper part of pre-antennal region and 1 in post-antennal region opposite each eye; number of marginal hairs on the temple as in male, but of the 10 hairs only 7 are long.

Thorax as in the male but with only 4 lateral and no posterior hairs on the prothorax and with 9–11 lateral and 3 posterior marginal hairs each side of pterothorax.

Abdomen of considerably greater size than that of male; segment I with postero-lateral corner produced into a sharp point each side. Tergal plates I–VII separated medianly; sternal plates as in male; terminal segments as shown in figure 9.

CHAETOTAXY OF THE ABDOMEN.—Lateral and dorso-lateral hairs on the posterior margin of segment I, 2–3 in number each side; segment II has 6–9 each side; segment III has 8 each side; segment IV has 8–9 each side; segment V has 10 each side; remaining segments as shown in figure 9. On the dorsal surface segment I has 5 hairs each side; segment II has 10 hairs; segment III has 7–9 hairs; segment IV has 7 hairs; segment V has 4 hairs; remaining segments as shown in figure 9. On the ventral surface segments I–III have 1 central hair each side; segments IV–VI have 2 central hairs each side; segment VII has 1 central hair and a number of minute spines each side; terminal segment as shown in figure 9.

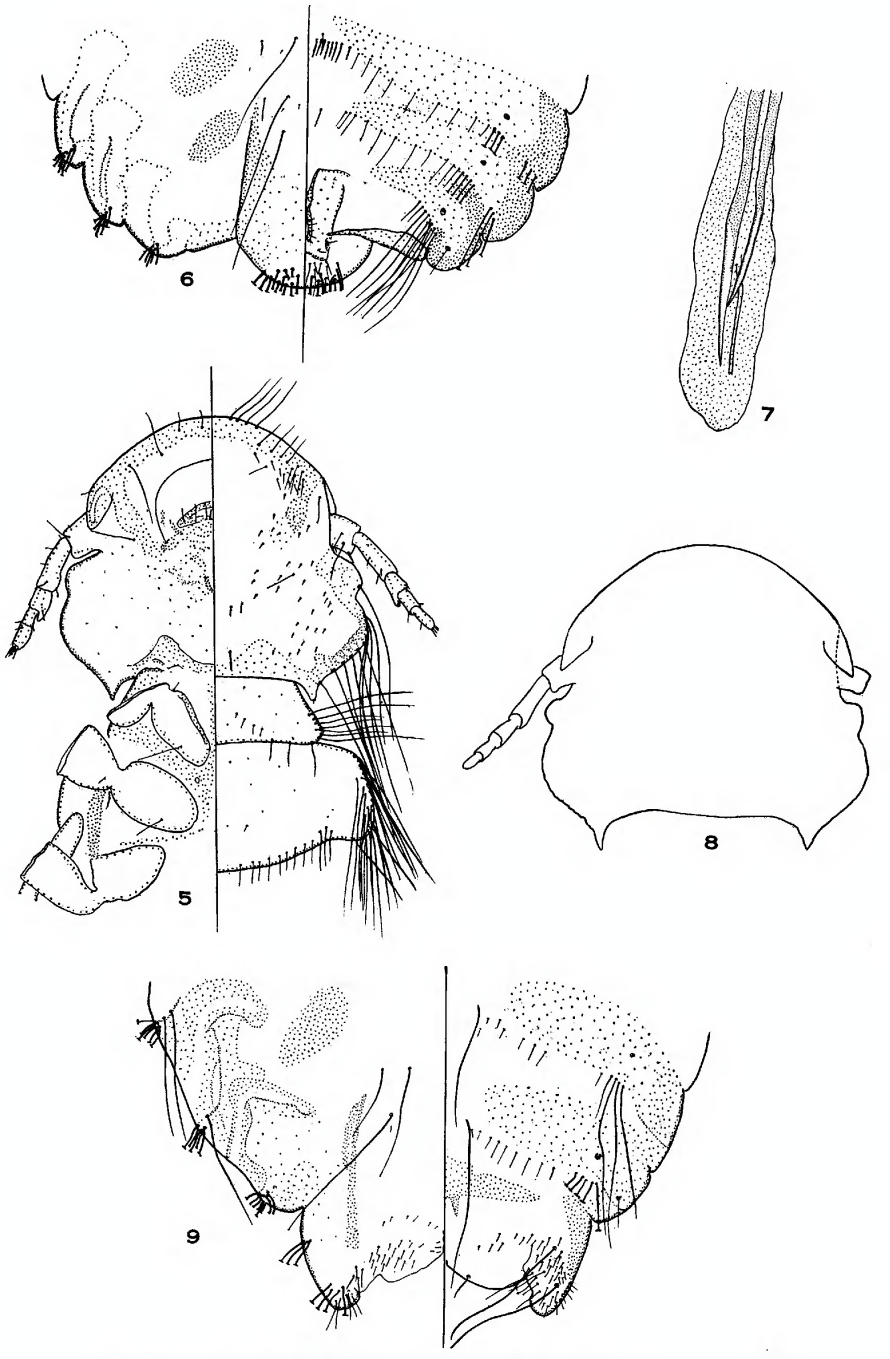


Fig. 5. *Goniodes wilsoni*, head and thorax of ♂.
Fig. 6. *Goniodes wilsoni*, terminal segments of ♂ abdomen.
Fig. 7. *Goniodes wilsoni*, distal end of ♂ genitalia.
Fig. 8. *Goniodes wilsoni*, head of ♀.
Fig. 9. *Goniodes wilsoni*, terminal segments of ♀ abdomen.

Measurements

	Male		Female	
	Length	Breadth	Length	Breadth
Head	0.92 mm.[1]	1.13 mm.	1.09 mm.	1.28 mm.
Prothorax	0.35	0.78	0.36	0.89
Pterothorax	0.46	1.16	0.49	1.32
Abdomen	1.69	1.70	2.96	2.04
Total	3.12		4.66	

Material Examined.—12♂, 16♀, from *Afropavo congensis*, from the E. Congo Forest, collected July, 1937.

Holotype.—♂ in the Belgian Congo Museum, Tervueren.

Named in honor of Rev. T. H. Wilson of Inkongo, Sonkuru District, who collected the specimens.

Goniodes chapini, new species

Figures 10 to 13

This species is unlike any hitherto recorded and resembles most nearly *G. afropavo* from the same host. It is distinguished from this latter species in the male by the shape of the head and by the form of the trabeculae, antennae and genitalia and in the female by the shape of the trabeculae and chaetotaxy of the terminal segments of the abdomen.

Description of Male.—Head (Fig. 10) with short blunt-ended trabeculae; antennae of unusual form with all segments enlarged and with segments I–III differing but little in length and width, and segment V rounded and somewhat globular distally.

Thorax as shown in figure 10.

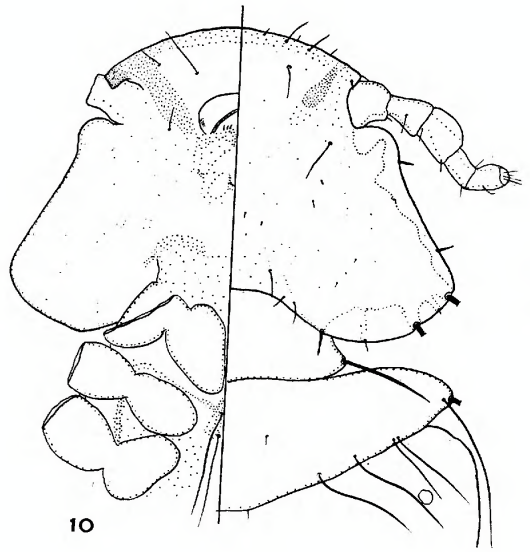
Abdomen short and rounded, broadest at the third segment and with segment I large; segment VIII greatly reduced and segment IX narrow and rounded posteriorly. Tergal plates I–VIII separated medianly; sternal thickening in the form of small lateral segmental plates each side of mid-line. Segments I–VI showing lateral internal circular structures not found elsewhere among the *Goniodes*.

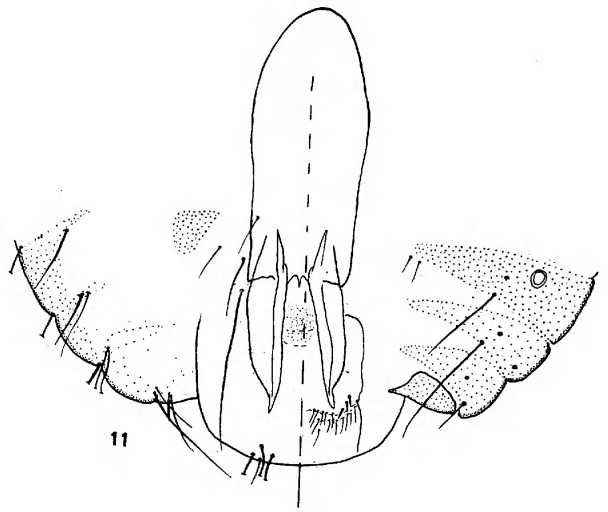
Chaetotaxy of the Abdomen.—On the dorsal surface segments I–II have 3 central hairs and 1 post-spiracular hair each side (those on segment I being in an equivalent position to the post-spiracular hairs of the other segments); segments III–V have 2 central hairs and a post-spiracular hair each side; segments VI–IX as shown in figure 11. On the ventral surface segments I–II have a central hair each side of the mid-line; segments III–IV have a central and a stout lateral hair each side; segments V–IX as shown in figure 11. Segment I has no postero-lateral hairs; segments II–VI have 1 postero-lateral hair each side.

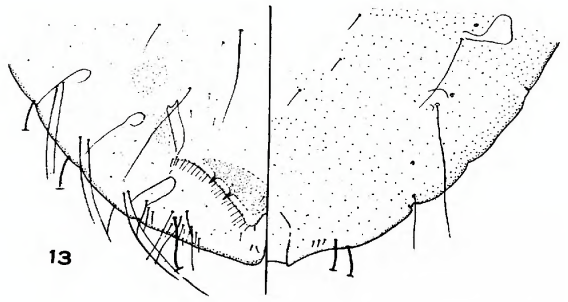
Genitalia with general characters as shown in figure 11 (material inadequate for detailed figure).

Description of Female.—Shape of head as shown in figure 12, with chaetotaxy as in the male but with the anterior marginal hairs shorter.

[1] Length measurement of heads taken along the median line; i.e, backward projections of temples are not included.







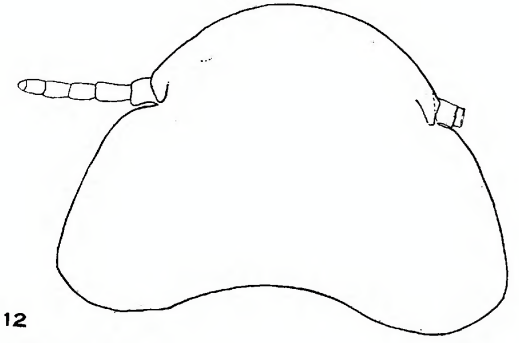


Fig. 10. *Goniodes chapini*, head and thorax of ♂.
Fig. 11. *Goniodes chapini*, terminal segments of ♂ abdomen.
Fig. 12. *Goniodes chapini*, head of ♀.
Fig. 13. *Goniodes chapini*, terminal segments of ♀ abdomen.

Thorax as in the male but there are 2 not 4 postero-lateral hairs each side of the pterothorax.

Abdomen rounded but somewhat more elongated than in the male with tergal plates I–VII separated medianly and sternal plates arranged as in the male.

CHAETOTAXY OF THE ABDOMEN.—On the dorsal surface segments I–VII with a central and a post-spiracular hair each side of the mid-line (in all the specimens examined, on segments I–IV only the clear "pustule" of the post-spiracular hairs are present, there being no hair attached); terminal segments as shown in figure 13. On the ventral surface segments I–II have a central hair each side of mid-line; segments III–IV have a central hair and a lateral hair each side; segment V has 2 central and 2 lateral hairs each side; terminal segments as shown in figure 13. Postero-lateral hairs as in male.

Measurements

	Male		Female	
	Length	Breadth	Length	Breadth
Head	0.36 mm.	0.60 mm.	0.42 mm.	0.66 mm.
Prothorax	0.15	0.35	0.17	0.36
Pterothorax	0.19	0.64	0.22	0.65
Abdomen	0.71	0.84	0.84	0.85
Total	1.26		1.38	

MATERIAL EXAMINED.—1♂, 5♀ from *Afropavo congensis* from E. Congo Forest collected in July, 1937.

HOLOTYPE.—♂ in The American Museum of Natural History.

Goniodes afropavo, new species

Figures 14 to 17

This species resembles most closely *G. chapini* from which it may be distinguished by the characters of the head and abdomen as given above under that species.

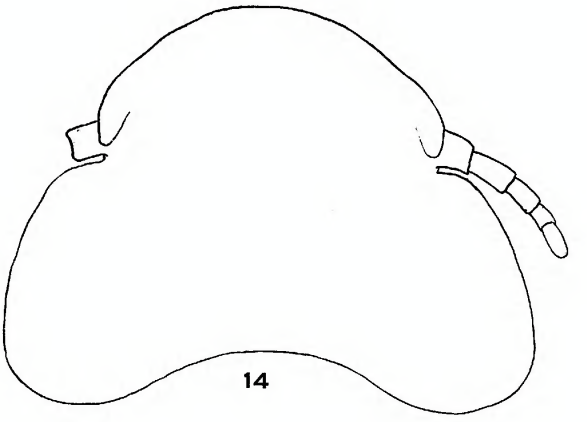
DESCRIPTION OF MALE.—Head (Fig. 14) with trabeculae longer and more pointed than in *G. Chapini;* antennae filiform and unmodified; chaetotaxy as in *G. Chapini.*

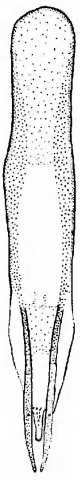
Thorax with shape and chaetotaxy as in the female of *G. chapini.*

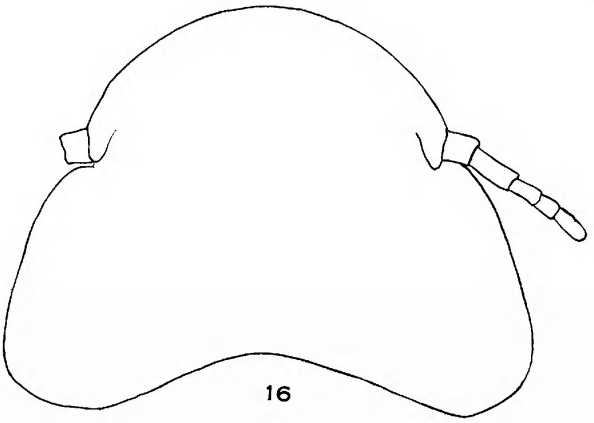
Abdomen similar to that of *G. chapini* but more elongated in shape; abdominal sclerites as in *G. chapini.*

CHAETOTAXY OF THE ABDOMEN.—On the dorsal surface segments I–II have 2 central hairs and 1 post-spiracular hair each side; segments III–V have 2 central hairs and 1 or 2 post-spiracular hairs each side, the outer of the central hairs are longer and stouter than in *G. chapini;* segments VI–VIII as in *G. chapini;* segment IX with 13–15 inner hairs. On the ventral surface segment I–II has a central hair each side of the mid-line; segment V has 2 central hairs and 2 lateral hairs each side; segment VI has a central hair and 2 lateral hairs each side; segment VII has a central hair and 4 lateral hairs each side; segment VIII has 6 lateral hairs each side; segment IX has three sub-marginal hairs each side. Postero-lateral hairs as in *G. chapini.*

Genitalia as shown in figure 15.







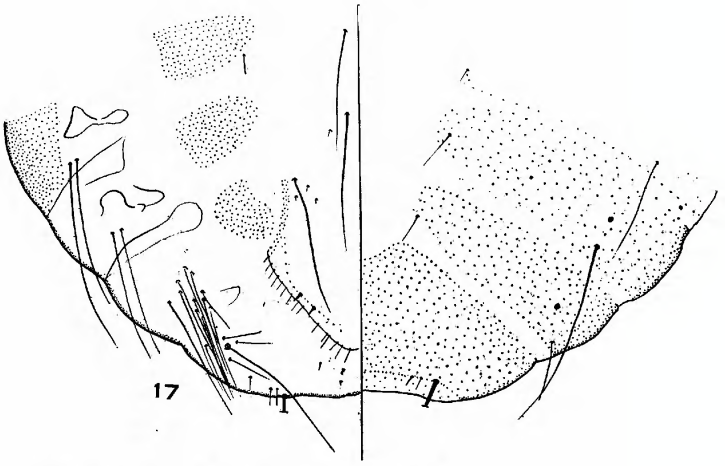


Fig. 14. *Goniodes afropavo*, head of ♂.
Fig. 15. *Goniodes afropavo*, genitalia of ♂.
Fig. 16. *Goniodes afropavo*, head of ♀.
Fig. 17. *Goniodes afropavo*, terminal segments of ♀ abdomen.

DESCRIPTION OF FEMALE.—Shape of head as shown in figure 16, with chaetotaxy as in *G. chapini*.

Thorax as in the male.

Abdomen more elongated than in *G. chapini* but otherwise similar except for the chaetotaxy of the terminal segments (Fig. 17).

Measurements

	MALE		FEMALE	
	Length	Breadth	Length	Breadth
Head	0.41 mm.	0.67 mm.	0.42 mm.	0.67 mm.
Prothorax	0.15	0.37	0.16	0.37
Pterothorax	0.21	0.67	0.22	0.67
Abdomen	0.76	0.86	0.91	0.85
Total	1.40		1.57	

MATERIAL EXAMINED.—4♂, 7♀, from *Afropavo congensis* from E. Congo Forest collected in July, 1937.

HOLOTYPE.—♂ in The American Museum of Natural History.